Algebra 2 Honors
Logarithmic Functions Test REVIEW

Name: KEY
Date: _____

1. Write in log form:

$2^5 = 32$

$\log_2 32 = 5$

$3^7 = 2187$

$\log_3 2187 = 7$

2. Write in exponential form:

$\log_7 2401 = 4$

$7^4 = 2401$

$\log 1000 = 3$

$10^3 = 1000$

3. Simplify:

$\log_2 2^{3x}$

$3x$

$\log^{3x} + \log^{2x}$

$3x \log + 2x \log$

$\boxed{6x^2 \log}$

4. Evaluate using a calculator. Round to 3 decimal places.

$\log_{150} 12$

$\frac{\log 12}{\log 150} = \boxed{0.496}$

$\log_3 513$

$\frac{\log 513}{\log 3} = \boxed{5.680}$

5. Expand by using the properties of logs to rewrite each expression as the sum or difference:

a) $\log_4 \frac{\sqrt{5x}}{y^3}$

$\log_4 (5x)^{\frac{1}{2}} - \log_4 y^3$

$\boxed{\frac{1}{2}\log_4 (5x) - 3\log_4 y}$

b) $\log 5x^7 y^8$

$\boxed{\log 5 + 7\log x + 8\log y}$

6. Condense the following expressions:

a) $7\log_5 b - \frac{1}{3}\log_5 a$

$\log_5 \frac{b^7}{a^{\frac{1}{3}}}$

b) $7\log x + \frac{1}{2}\log y + \log(z-7)$

$\log\left(x^7 y^{\frac{1}{2}} (z-7)\right)$

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7. Solve for x. Round to the nearest hundredth if necessary.

a) $\log_5(x+10) = \log_5 17$

$x+10=17$

$\boxed{x=7}$

b) $\left(7^{2x}+3\right)^2 = 58$

$7^{2x}+3=\sqrt{58}$

$7^{2x}=\sqrt{58}-3$

$2x \log 7 = \log(\sqrt{58}-3)$

$\boxed{x=0.39}$

c) $8^{5x-3}+7000=2090152$

$(5x-3)\log 8 = \log 2083152$

$5x-3=6.996778894$

$\boxed{x=2}$

d) $6\left(4^{2x}-7\right)=1200$

$4^{2x}-7=200$

$4^{2x}=207$

$2x \log_4 = \log 207$

$\boxed{x=1.92}$

e) $7\log_4 5x = 19$

$\log_4 5x = 2.714$

$4^{2.714}=5x$

$\boxed{x=8.61}$

f) $\log_5 x - 5 = 120$

$\log_5 x = 125$

$\boxed{5^{125}=x}$

8. You have $4,500 to invest into an account that earns 4% interest.

a) If the account compounds continuously. How many years will it take to double your money?

Use the formula:
$A = Pe^{rt}$

b) If the account compounds annually. How many years will it take to double your money?

Use the formula:
$A = P(1+\frac{r}{n})^{nt}$

c) If the account compounds monthly. How many years will it take to double your money?